In the Claims

Applicant has submitted a new complete claim set showing marked up claims with deletions indicated by double bracketing.

Please amend pending claim 52 as noted below.

1. (Original) An electrochemical device comprising:

an anode constructed of a material such that the anode is a chemically rechargeable anode; and

a source of fuel exposable to the anode.

2. (Original) The device of claim 1, further comprising a source of a chemical reductant to chemically recharge the anode.

3. (Original) The device of claim 2, wherein the source of the chemical reductant is the source of the fuel.

4. (Original) The device of claim 1, wherein the anode comprises a metal.

5. (Original) The anode of claim 4, wherein the metal has a standard reduction potential greater than -0.70 V versus the Standard Hydrogen Electrode.

6. (Original) The anode of claim 1, wherein the anode comprises at least two metals.

7. (Original) The anode of claim 6, wherein each metal has a standard reduction potential greater than 0.70 V versus the Standard Hydrogen Electrode.

8. (Original) The anode of claim 1, wherein the anode is chemically rechargeable to a reduced state from an oxidized state comprising an oxide selected from the group consisting of a metal oxide and a mixed metal oxide.

9. (Original) The device of claim 1, wherein the device is capable of producing electricity in the absence of the fuel.

10. (Original) The device of claim 1, further comprising an electrolyte in ionic communication with the anode.

11. (Original) The device of claim 10, wherein the electrolyte is a solid-state electrolyte.

12. (Original) The device of claim 11, wherein the solid-state electrolyte has a formula $(ZrO_2)(HfO_2)_a(TiO_2)_b(Al_2O_3)_c(Y_2O_3)_d(M_xO_y)_e$ where a is from 0 to about 0.2, b is from 0 to about 0.5, c is from 0 to about 0.5, d is from 0 to about 0.5, x is greater than 0 and less than or equal to 2, y is greater than 0 and less than or equal to 3, e is from 0 to about 0.5, and M is selected from the group consisting of calcium, magnesium, manganese, iron, cobalt, nickel, copper, and zinc.

13. (Original) The device of claim 12, wherein the solid-state electrolyte is selected from the group consisting of (ZrO_2), $(ZrO_2)(Y_2O_3)_{0.08}$, $(ZrO_2)(HfO_2)_{0.02}(Y_2O_3)_{0.08}$, $(ZrO_2)(HfO_2)_{0.02}(Y_2O_3)_{0.05}$, $(ZrO_2)(HfO_2)_{0.02}(Y_2O_3)_{0.08}(Ti)_2)_{0.10}$, $(ZrO_2)(HfO_2)_{0.02}(Y_2O_3)_{0.08}(Al_2O_3)_{0.10}$, $(ZrO_2)(Y_2O_3)_{0.08}(Fe_2O_3)_{0.05}$, $(ZrO_2)(Y_2O_3)_{0.08}(CoO)_{0.05}$, $(ZrO_2)(Y_2O_3)_{0.08}(ZnO)_{0.05}$, $(ZrO_2)(Y_2O_3)_{0.08}(NiO)_{0.05}$, $(ZrO_2)(Y_2O_3)_{0.08}(CuO)_{0.05}$, $(ZrO_2)(Y_2O_3)_{0.08}(MnO)_{0.05}$ and ZrO_2CaO.

14. (Original) The device of claim 10, further comprising a cathode in ionic communication with the electrolyte.

15. (Original) The device of claim 14, wherein the cathode is a solid-state cathode.

16. (Original) The device of claim 15, wherein the solid state cathode is selected from the group consisting of a metal oxide and a mixed metal oxide.

17. (Original) The device of claim 16, wherein the solid state cathode is selected from the group consisting of tin-doped In_2O_3, aluminum-doped zinc oxide and zirconium-doped zinc oxide.

18. (Original) The device of claim 16, wherein the solid state cathode is a perovskite-type oxide.

19. (Original) The device of claim 18, wherein the perovskite-type oxide has a formula $La_xMn_yA_aB_bC_cO_d$ where A is an alkaline earth metal, B is selected from the group consisting of scandium, yttrium and a lanthanide metal, C is selected from the group consisting of titanium, vanadium, chromium, iron, cobalt, nickel, copper, zinc, zirconium, hafnium, aluminum and antimony, x is from 0 to about 1.05, y is from 0 to about 1, a is from 0 to about 0.5, b is from 0 to about 0.5, c is from 0 to about 0.5 and d is between about 1 and about 5, and at least one of x, y, a, b and c is greater than zero.

20. (Original) The device of claim 19, wherein the perovskite-type oxide is selected from the group consisting of $LaMnO_3$, $La_{0.84}Sr_{0.16}MnO_3$, $La_{0.84}Ca_{0.16}MnO_3$, $La_{0.84}Ba_{0.16}MnO_3$, $La_{0.65}Sr_{0.35}Mn_{0.8}Co_{0.2}O_3$, $La_{0.79}Sr_{0.16}Mn_{0.85}Co_{0.15}O_3$, $La_{0.84}Sr_{0.16}Mn_{0.8}Ni_{0.2}O_3$, $La_{0.84}Sr_{0.16}Mn_{0.8}Fe_{0.2}O_3$, $La_{0.84}Sr_{0.16}Mn_{0.8}Ce_{0.2}O_3$, $La_{0.84}Sr_{0.16}Mn_{0.8}Mg_{0.2}O_3$, $La_{0.84}Sr_{0.16}Mn_{0.8}Cr_{0.2}O_3$, $La_{0.6}Sr_{0.35}Mn_{0.8}Al_{0.2}O_3$, $La_{0.84}Sc_{0.16}MnO_3$, $La_{0.84}Y_{0.16}MnO_3$, and $La_{0.7}Sr_{0.3}CoO_3$, $LaCoO_3$, $La_{0.7}Sr_{0.3}FeO_3$, and $La_{0.5}Sr_{0.5}Co_{0.8}Fe_{0.2}O_3$.

21. (Original) The device of claim 15, wherein the cathode comprises a metal.

22. (Original) The device of claim 21, wherein the metal is selected from the group consisting of platinum, palladium, gold, silver, copper, rhodium and combinations thereof.

23. (Original) The device of claim 1, wherein the device is operable at a temperature of less than about 1500 °C.

24. (Original) The device of claim 1, wherein the device is operable at a temperature of less than about 1300 °C.

25. (Original) The device of claim 1, wherein the device is operable at a temperature of less than about 1000 °C.

26. (Original) The device of claim 23, wherein the device is operable at a temperature from about 300 °C to about 1500 °C.

27. (Original) The device of claim 26, wherein the device is operable at a temperature from about 300 °C to about 1300 °C.

28. (Original) The device of claim 1, wherein the anode comprises a material selected from the group consisting of copper, molybdenum, mercury, iridium, palladium, antimony, rhenium, bismuth, platinum, silver, arsenic, rhodium, tellurium, selenium, osmium, gold, lead, germanium, tin, indium, thallium, cadmium, gadolinium, chromium nickel, iron, tungsten, vanadium, manganese, cobalt, zinc and combinations thereof.

29. (Original) The device of claim 28, wherein anode is selected from the group consisting of antimony, indium, tin, bismuth, mercury and lead.

30. (Original) The device of claim 1, wherein the anode comprises an alloy comprising at least one element selected from the group consisting of copper, molybdenum, mercury, iridium, palladium, antimony, rhenium, bismuth, platinum, silver, arsenic, rhodium, tellurium, selenium, osmium, gold, lead, germanium, tin, indium, thallium, cadmium, gadolinium, chromium, nickel, iron, tungsten, vanadium, manganese, zinc and cobalt.

31. (Original) The device of claim 1, wherein the fuel, when exposed to the anode, is in contact with the anode.

32. (Original) The device of claim 1, wherein the fuel, when exposed to the anode, is in contact with the oxidized portion of the anode.

33. (Original) The device of claim 1, wherein the source of fuel comprises a reservoir of fuel.

34. (Original) The device of claim 33, wherein the source of fuel is exposable to the anode via a guide connecting the reservoir to an inlet directed towards the anode.

35. (Original) The device of claim 1, wherein the fuel is selected from the group consisting of a carbonaceous material, sulfur, a sulfur-containing organic compound, a nitrogen-containing organic compound, ammonia, hydrogen and mixtures thereof.

36. (Original) The device of claim 35, wherein the carbonaceous material is selected from the group consisting of conductive carbon, graphite, quasi-graphite, coal, coke, charcoal, fullerene, buckminsterfullerene, carbon black, activated carbon, decolorizing carbon, a hydrocarbon, an oxygen-containing hydrocarbon, carbon monoxide, fats, oils, a wood product, a biomass and combinations thereof.

37. (Original) The device of claim 36, wherein the hydrocarbon material is selected from the group consisting of saturated and unsaturated hydrocarbons.

38. (Original) The device of claim 36, wherein the hydrocarbon material is selected from the group consisting of aliphatics, alicyclics, aromatics and mixtures thereof.

39. (Original) The device of claim 38, wherein the hydrocarbon material is selected from the group consisting of gasoline, diesel, kerosene, methane, propane, butane, natural gas, and mixtures thereof.

40. (Original) The device of claim 36, wherein the oxygen-containing hydrocarbon is an alcohol.

41. (Original) The device of claim 40, wherein the alcohol is selected from the group consisting of a C_1-C_{20} alcohol and a combination of C_1-C_{20} alcohols.

42. (Original) The device of claim 41, wherein the alcohol is selected from the group consisting of methanol, ethanol, propanol, butanol and mixtures thereof.

43. (Original) The device of claim 1, wherein the source of the fuel comprises a variable source for at least two different fuels.

44. (Original) The device of claim 1, wherein the source of the fuel is capable of being interchanged with a different source of the fuel.

45. (Original) The device of claim 44, wherein the source of the fuel is capable of being interchanged with a different source of a different fuel.

46. (Original) The device of claim 1, wherein the device is capable of an electrical output of at least about 10 $mWatt/cm^2$.

47. (Original) The device of claim 1, wherein the device is capable of an electrical output of at least about 100 $mWatt/cm^2$.

48. (Original) The device of claim 1, wherein the device is capable of an electrical output of at least about 200 $mWatt/cm^2$.

49. (Original) The device of claim 1, wherein the device is self-repairing.

50. (Original) The device of claim 49, wherein the anode further comprises a sealant precursor.

51. (Original) The device of claim 50, wherein the anode comprises a sealant precursor to seal a flaw in a solid state electrolyte, when exposed to oxygen.

52. (Currently Amended) An anode being constructed of a material such that the anode is a chemically rechargeable anode.[[44]]

53-107.(Withdrawn)

108. (Original) A method for energy conversion, comprising:

providing a fuel cell; and

switching the fuel cell to a battery by ceasing a supply of a fuel to an anode in the fuel cell.

109-113. (Withdrawn)